



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/786,842	02/25/2004	Michael G. Reynolds	GP-303485	2934

7590 07/11/2006  
LESLIE C. HODGES  
General Motors Corporation  
Legal Staff, Mail Code 482-C23-B21  
P.O. Box 300  
Detroit, MI 48265-3000

EXAMINER
----------

ROJAS, BERNARD

ART UNIT	PAPER NUMBER
----------	--------------

2832

DATE MAILED: 07/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No. 10/786,842	Applicant(s) REYNOLDS ET AL.	
Examiner Bernard Rojas	Art Unit 2832	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04/17/2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 17-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 6, 8-10, 12, 13, 15, 18 and 20 is/are rejected.
- 7) ☒ Claim(s) 4, 7, 14 and 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments, filed 04/17/2006, with respect to the rejection(s) of the pending claims have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Suzuki et al. [US 6,960,847] which discloses an electromagnetic device consisting of a housing, two coils and an armature with two radially magnetized permanent magnets [figures 1, 4 and 5].

### ***Claim Rejections - 35 USC § 103***

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-15 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. [US 6,960,847] in view of Hirabayashi et al. [US 5,434,549].

Claim 1, Suzuki et al. discloses a magnetic force generator comprising a shell [11] internally defining an armature chamber having an axis [along 24]; at least two circumferential electric coils [12 and 13] spaced axially within the chamber; an armature [24] supported in the chamber for reciprocation on the axis, the armature including at least two axially spaced permanent magnets [figure 4, 32 and 33] mounted on an axially extending non-magnetic tube [figure 1]; the permanent magnets extending axially, inwardly adjacent and in general alignment with the electric coils [figures 1 and 5]; the magnets having radially extending flux lines passing through the coils [figure 5]; and controlled energizing of the coils being operative on the permanent magnets to reciprocate the armature axially in a controlled manner relative to the shell [abs].

Suzuki et al. fails to teach resilient members nominally centering the armature in the chamber.

Hirabayashi et al. discloses a magnetic force generator comprising a shell [1] internally defining an armature chamber having an axis [along 25]; at least two circumferential electric coils [2A, 2B, 2C] spaced axially within the chamber; an armature [3] supported in the chamber for reciprocation on the axis, the armature including at least two axially spaced permanent magnets [5A, 5B] mounted on an axially

extending non-magnetic tube [figure 1] and resilient members [29] nominally centering the armature in the chamber.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the resilient members of Hirabayashi et al. to the device of Suzuki et al. in order to nominally centering the armature in the chamber when no magnetic force is applied.

Claim 2, Suzuki et al. discloses a magnetic force generator as in claim 1 wherein the magnets are cylindrical [figure 4].

Claim 3, Hirabayashi et al. teaches that the resilient members are compression springs [col. 15 lines 65-66].

Claims 4 and 14, Suzuki et al. discloses the shell being part of a housing including ends [3 and 4] closing the chamber, but fails to teach that the ends are made of non-magnetic material. It would have been obvious to one of ordinary skill in the art at the time the invention was made to construct the ends of non-magnetic material in order to direct the magnetic flux line between the coil and the magnet as shown in figure 5.

Claim 5, Suzuki et al. discloses a magnetic force generator as in claim 1 wherein the shell is formed of material that carries magnetic flux [col. 4 lines 55-60].

Claim 6, Suzuki et al. discloses the claimed invention except for the use of a carbon steel shell. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use carbon steel over the steel shell disclosed by Suzuki in order to obtain the benefit of increased shell strength [col. 4 lines 55-60].

Claim 7 and 17, Suzuki et al. discloses the claimed invention except for the armature having end caps of non-magnetic material. It would have been obvious to one of ordinary skill in the art at the time the invention was made to construct the armature with non-magnetic end caps in order to direct the magnetic flux line between the coil and the magnet as shown in figure 5.

Claims 8 and 9, Suzuki et al. as modified discloses the claimed invention except for the composition of the permanent magnets. It would have been obvious to one of ordinary skill in the art at the time the invention was made to alter the composition of the permanent magnets in order to change the magnetic properties of the device, alter the armature response time, adjust the armature weight or the cost of manufacturing [Hirabayashi et al. teaches using rare earth permanent magnets col. 15 line 68 to col. 16 line 3 and col. 14 lines 64-70].

Claim 10, Suzuki et al. discloses a magnetic force generator as in claim 1 wherein the magnets are radially magnetized in opposite directions [figure 4].

Claim 11, Suzuki et al. discloses a magnetic force generator as in claim 1 wherein the coils are wound in opposite directions [figure 4].

Claim 12, Suzuki et al. discloses a magnetic force generator as in claim 1 wherein the axial length of the coils is generally similar to the axial length of the magnets [figure 5].

Claim 13, Suzuki et al. discloses a magnetic force generator comprising a shell [11] internally defining an armature chamber having an axis [along 24]; at least two circumferential electric coils [12 and 13] spaced axially and fixed within the chamber; an

Art Unit: 2832

armature [24] supported in the chamber for reciprocation on the axis, the armature including at least two axially spaced permanent magnets [figure 4, 32 and 33] mounted on an axially extending non-magnetic tube [figure 1];

the permanent magnets extending axially, inwardly adjacent and in general alignment with the electric coils [figures 1 and 5]; the magnets having radially extending flux lines passing through the coils [figure 5]; and controlled energizing of the coils being operative on the permanent magnets to reciprocate the armature axially in a controlled manner relative to the shell [abs].

Suzuki et al. fails to teach resilient members nominally centering the armature in the chamber.

Hirabayashi et al. discloses a magnetic force generator comprising a shell [1] internally defining an armature chamber having an axis [along 25]; at least two circumferential electric coils [2A, 2B, 2C] spaced axially within the chamber; an armature [3] supported in the chamber for reciprocation on the axis, the armature including at least two axially spaced permanent magnets [5A, 5B] mounted on an axially extending non-magnetic tube [figure 1] and resilient members [29] nominally centering the armature in the chamber.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the resilient members of Hirabayashi et al. to the device of Suzuki et al. in order to nominally centering the armature in the chamber when no magnetic force is applied.

Claim 15, Suzuki et al. discloses a magnetic force generator as in claim 13 wherein the shell is formed of material that carries magnetic flux [col. 4 lines 55-60].

Claim 18, Suzuki et al. a magnetic force generator as in claim 13 wherein the magnets are radially magnetized in opposite directions [figure 4].

Claim 19, Suzuki et al. discloses a magnetic force generator as in claim 13 wherein the coils are wound in opposite directions [figure 4].

Claim 20, Suzuki et al. discloses a magnetic force generator as in claim 13 wherein the axial length of the coils is generally similar to the axial length of the magnets [figure 5].

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard Rojas whose telephone number is (571) 272-1998. The examiner can normally be reached on M-F 8-4:00), every other Friday off.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin G. Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 2832

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Brend Ryz*  
Br

  
ELVIN ENAD  
SUPERVISORY PATENT EXAMINER

*07 July 06*